

CLAIMS

1. A method of identifying one or more objects, particularly teeth, in a digitized X-ray image, characterized in that the areas depicting the possible object(s) are specified, using image-processing algorithms, by segmentation and/or edge detection of the X-ray image, and that these areas are, for further specification thereof, linked by computation to those image parameters of the X-ray apparatus which are used for making the X-ray image.
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10. 2. A method as defined in claim 1, characterized in that the apparatus-specific parameters are linked to parameters of a non-patient-related tooth data bank, in order to obtain probable actual geometrical positions across the areas depicting the possible object(s).
15. 3. A method as defined in claim 1 or claim 2, characterized in that clustering of recognized areas is carried out prior to said linking to the apparatus-specific parameters.
20. 4. A method as defined in any one of claims 1 to 3, characterized in that additionally patient-specific parameters are linked by computation for further specification of the areas depicting the possible object(s).
25. 5. A method as defined in the previous claim, characterized in that position data, trajectories, and starting and finishing points of the X-ray apparatus are taken into account during computation.
30. 6. A method as defined in any one or more of the previous claims, characterized in that anatomic patient characteristics such as race, age, sex, size, weight, and/or previous treatments are taken into account during computation.
7. A method as defined in any one or more of the previous claims, characterized in that the user is presented with proposals concerning the recognized objects, which proposals can be interactively edited or confirmed.

8. A method as defined in any one or more of the previous claims, characterized in that the thus determined information on the objects is stored separately in a data bank and can be called on for re-use.

5 9. A system for the identification of objects, particularly teeth, in a digitized X-ray image, comprising

- an input and output device for the interactive control of the system, and

10 - a processing unit which has access to the digitized X-ray image and has access to apparatus-specific information concerning the X-ray apparatus and which delimits the object in the digitized X-ray image on the basis of said information and also by segmentation and/or edge detection.

15 10. A system as defined in claim 9, characterized in that the processing unit has access to a non-patient-related tooth data bank.

11. A system as defined in claim 9 or claim 10, characterized in that the processing unit exhibits means for clustering the areas existing after segmentation and/or edge detection.

20 12. A system as defined in one or more of claims 9 to 11, characterized in that the processing unit has access to patient-specific information.

25 13. A system as defined in one or more of claims 9 to 12, characterized in that means are provided for submitting a proposal to the user, which he can accept, reject, or modify.

30 14. A system as defined in one or more of claims 9 to 13, characterized by a computer interface to the X-ray apparatus, via which the apparatus-specific data can be accessed.

15. A system as defined in any one or more of the previous claims 9 to 14, characterized in that apparatus-specific parameters such as position data, trajectories, and

starting and finishing points of the X-ray apparatus can be called on for inclusion in computation.

16. A system as defined in one or more of claims 9 to 15, characterized in that anatomic patient characteristics such as race, age, sex, size, weight and/or previous treatments are present in a data bank and are taken into consideration during computation.
17. A system as defined in any one or more of the previous claims, characterized in that statistical data, such as the ratio of the individual anatomic dimensions to each other, are placed in a data bank and are taken into account during computation.
18. A system as defined in any one or more of the previous claims, characterized in that the system is a PC controlled by software.
19. A system for assigning information to objects, particularly teeth, which are specified in a digitized X-ray image or a schematic diagram, comprising
 - 20. - an input and output device for interactive control of the system,
 - a storage area, in which the X-ray image or the schematic diagram is placed, object-labelling information being assigned to the X-ray images or the schematic diagrams,
 - a second storage area, in which information concerning the objects is placed, references between the objects and the object-labelling information being stored,
 - 25 - a processing unit which controls accepting, deleting, and/or accessing operations in the storage areas and which manages references, said operations being preferably initiated via the input device and displayed on the output device.

20. A system as defined in claim 19, characterized in that the objects are shown optically high-lighted on the output device and can be further selected in order to retrieve the saved information.
- 5 21. A system as defined in claim 20, characterized in that when an object is selected, access to further branched information, if present, is enabled.
- 10 22. A system as defined in any one of claims 19 to 21, characterized in that the references are managed in the form of links positioned either directly near the object and/or directly near the information and/or are managed separately.
- 15 23. A system as defined in one or more of claims 19 to 22, characterized in that the output device is a visual display unit and the further information is displayed in an automatically opening display field (pop-up window) or the further information leads to a new screen build-up.
- 20 24. A system as defined in one or more of claims 19 to 23, characterized in that the other information is diagnostic and/or treatment information and/or other X-ray images, particularly of details.
- 25 25. A system as defined in any one or more of claims 19 to 25, characterized by a computer interface to an X-ray apparatus, which X-ray apparatus transmits, via the computer interface, information in the form of data for representation as X-ray images, this information being deposited in a third storage area and a reference to an object being saved to a fourth storage area.
26. A system as defined in any one or more of claims 19 to 25, characterized in that the information can be hierarchically arranged over a number of levels.
- 30 27. A system as defined in any one or more of claims 19 to 26, characterized by means allowing for manual specification of objects by selection of a specific area of the X-ray image.
28. A system as defined in any one or more of claims 19 to 27, characterized by the

functionality of a data bank system.

29. A system as defined in any one or more of claims 19 to 28, characterized by the features of a system for identification of objects, particularly teeth, in a digitized X-ray image as defined in any one or more of the previous claims.

30. A method of assigning information to objects, particularly teeth, which have been specified in a digitized X-ray image or a schematic diagram representation, comprising

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- a first step, in which the digitized X-ray image or the schematic diagram is made,

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- a second step, in which specification of the objects, if not already specified, is carried out manually or automatically,

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- a third step, in which that object is selected for which further information is to be saved, accessed, or deleted,

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- and a fourth step, in which
 - a) when an interrogation operation is carried out, a reference is followed which has been deposited in relation to the object, which reference is used to determine what information is to be shown,

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- b) when a deleting operation is carried out, a reference is followed which has been deposited in relation to the object, which reference and/or the information is deleted,

- c) when a storage operation is carried out, an object is selected, a storage area for the information is allocated, and a storage area for the reference is allocated, in order that the new information and the corresponding reference can be saved to these storage areas.

31. A method as defined in claim 31, characterized in that following specification of the object, data for making digital images are received from the X-ray apparatus, which data are automatically assigned to the specified object.
- 5 32. A method as defined in any one or more of claims 30 to 31, characterized in that the information is in the form of graphical markings which can be placed over the images as an overlay.
- 10 33. A method as defined in any one or more of claims 30 to 32, characterized in that areas of the objects can be specified to which information can be assigned.
34. A method as defined in any one or more of claims 30 to 33, characterized in that pop-up menus relating to the individual objects can be accessed.